

Pharmacokinetics: Biological membrane, absorption, distribution, biotransformation and Excretion of drugs.

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Definition

- Pharmacokinetics (PK) represents “what the body does to the drug,” whereas pharmacodynamics (PD) can be defined as “what the drug does to the body,” or, more specifically, to target cell-types, tissues, or organs

- Pharmacokinetics can be simply described as the study of 'what the body does to the drug' and includes:
 - the rate and extent to which drugs are absorbed into the body and distributed to the body tissues
 - the rate and pathways by which drugs are eliminated from the body by metabolism and excretion
 - the relationship between time and plasma drug concentration.
- Understanding these processes is extremely important for prescribers because they form the basis on which the optimal dose regimen is chosen and explain the majority of the inter-individual variation in the response to drug therapy.

Four phases of pharmacokinetics

- Drug absorption
- Drug metabolism
- Drug excretion
- Concentration-time relationships
- Repeated drug dosing

- The main processes involved in pharmacokinetics are absorption, distribution, and the two routes of drug elimination, metabolism and excretion. Together they are sometimes known by the acronym 'ADME'. Distribution, metabolism and excretion are sometimes referred to collectively as drug disposition.
- Absorption is the process by which drugs enter the body. Given by any route other than intravenously, drug molecules must cross tissue membranes (e.g. skin epithelium, subcutaneous tissue, gut endothelium, capillary wall) to enter the blood.
- Distribution is the process by which drugs move around the body. After entering the blood, drug molecules must cross capillary walls to enter the tissues, reach cell membranes and enter cells.

- Metabolism is the process by which drugs are chemically altered to make them sufficiently water-soluble for excretion in urine or faeces (via the biliary tract). Metabolism occurs in a variety of body organs and tissues, but chiefly in the liver, gut wall, kidney and skin.
- Excretion is the process by which drugs leave the body. Drugs that are sufficiently water-soluble will be excreted unchanged in the urine. Lipid-soluble drugs must be modified to water-soluble metabolites before excretion via the kidney or into the intestine via the bile.